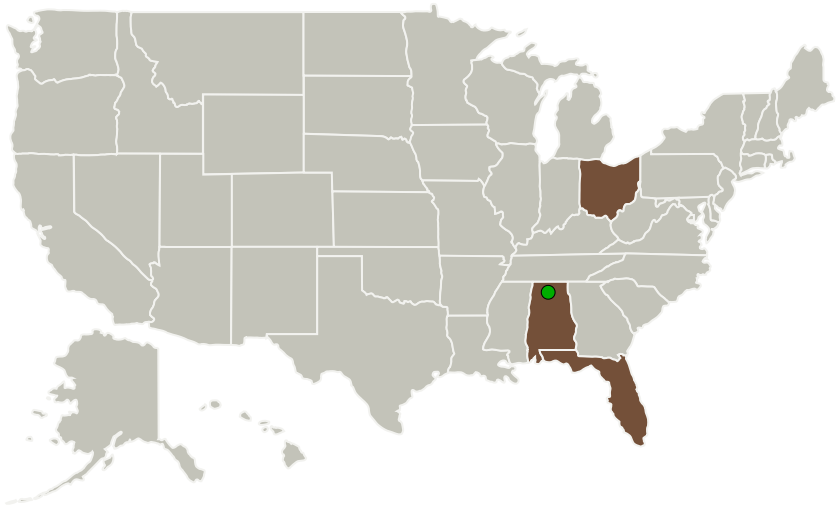
Equipment for Solid State Stir Welding of High Temperature Materials, Phase I

Completed Technology Project (2011 - 2012)

Project Introduction

Stir welding generates high-quality joints in fabricated structure and is the baseline joining process for most NASA aluminum alloy structures such as cryogenic tanks and lightweight structures. Incorporating ultrasonic vibration to critical stir welding machine components will enable and expand stir welding to other high-strength, high-temperature alloys using solid state joining. This project will scale up proven ultrasonic vibration technology and incorporate it on a NASA stir welding machine for the weld fabrication of extendable liquid rocket engine skirts and other high temperature applications for space structures.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Keystone Synergistic Enterprises, Inc.	Lead Organization	Industry	Port Saint Lucie, Florida
Edison Welding Institute	Supporting Organization	Academia	Columbus, Ohio
Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

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Primary U.S. Work Locations	
Alabama	Florida
Ohio	

Project Transitions

February 2011: Project Start

February 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138138)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Keystone Synergistic Enterprises, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

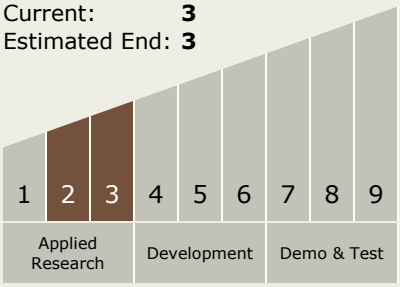
Carlos Torrez

Principal Investigator:

Raymond Walker

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.4 Manufacturing
    - TX12.4.1 Manufacturing Processes

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System